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NOTE ON THE RELATIONSHIP OF AN ICHNEUMONID TO CERTAIN DIGGER WASPS

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The digger wasps,[1] *Podalonia violaceipennis* (Lep.) and *Sphex xanthopterus* (Cam.), have been found fairly common nesting in the sand of the Los Angeles River. The nesting females have been studied in the field, their prey with attached egg secured, brought to the laboratory and development witnessed. In this way certain parasites and other insects, affecting the young of these wasps, have been reared. Among these is a large ichneumonid, *Paniscus* sp.[2], which ravages the food of the wasp larva and later kills it.

The prey of *P. violaceipennis* and *S. xanthopterus* among others, consists of *Zale lunata* (Drury[3]) and its varieties and *Homoptera salicis* Behr, the latter species having been determined by the late Dr. William Barnes. It is with *Z. lunata*, however, that this paper more specifically deals.

The first record of *Paniscus*, obtained by the author, was secured from a nest of *P. violaceipennis* on August 11th, several years ago at Universal City, California. The wasp egg was broken while transporting it and later perished. Little attention was given to the prey until August 18th when a large, nearly mature, larva had almost finished eating it. On the morning of the 19th this larva, to all appearances. had finished a cocoon which differed in many ways from that formed by the larva of the wasp, *P. violaceipennis*. Thick black strands held suspended in the center of the vial measuring 14 mm. in diameter, a nearly black cocoon. This cocoon measured 16 mm. in length, 6 mm. in diameter through the center and about 5 mm. at either end. An adult ichneumonid, a *Paniscus*, possibly *semirufus*, emerged

[1] Wasps referred to in this paper have been determined by Professor H. T. Fernald.

[2] Determined by Mr. R. A. Cushman, as *Paniscus* sp. or possibly *P. semirufus* Hgn.

[3] Determined by Dr. John A. Comstock.

from the cocoon on September 4th by cutting a circular cap off the anterior end.

On September 7th another nest was taken, the wasp egg of which was broken before it had time to hatch. By September 12th a small larva was found feeding from the prey between the first and second pairs of true legs. At this time it was light in color and very small, measuring barely 1.5 mm. in length. It continued feeding and grew rather rapidly. By September 17th, it had increased in size until it was 17 mm. in length and nearly 7 mm. through the widest part of its body. By this time it had eaten almost all of the prey and was nearly full-grown. This larva was able to re-attach itself, if removed from its prey, and did so under observation. It fed, however, for the most part continuously from the same spot.

The morning of September 18th found the larva with its food devoured, its body pale green in color and its activity rather feeble. During the afternoon of the same day it began a framework of fibers for its cocoon. These were light at first but soon became darker and finally almost black. By evening an outline of the cocoon had been formed and by the next morning a typical cocoon of this species was almost, if not entirely, finished.

The question early arose as to what would happen to the young of the wasp if the egg had not been broken and its larva had lived to come in contact with that of the ichneumonid. The opportunity of learning this soon presented itself for the prey of *P. violaceipennis*, from a nest taken later, soon held a small parasite between its fore legs and the small wasp larva on an abdominal segment. Each continued to feed in its respective position until approximately half-grown, when the food supply gave out. The ichneumonid larva soon attacked the waspling and devoured it. The feeding over, the surviving larva then spun a cocoon, pupated and later emerged a mature insect.

It was noted at the time of emergence that a large mass of material remained in the cocoon. This was compact, light yellow and rather stiff in consistency. It was probably fecal matter, together with larval and pupal skins. It was again noted in the spring of 1932 under somewhat different circumstances. At this time rodents in burrowing in the banks of the Los Angeles River unearthed several cocoons of *Paniscus*. These exposed to

the sun were conspicuous on the mounds. Several were secured, each of which, with one exception, when opened contained a dead larva. This one held a live pupa, which was apparently entirely surrounded with a liquid. The pupa, exposed and removed from the cocoon and liquid, soon died. It is a question if this substance held any important place under these conditions in the life of the insect.

The ichneumonid was reared also while studying the habits of *S. xanthopterus* using like prey. The interesting but serious relationship, in so far as the young of the wasp and the moth is concerned, was again observed. The nest and prey, with the egg of *S. xanthopterus*, were taken late on the afternoon of October 8, 1927, at Los Angeles, California. By October 11th the wasp's egg had already hatched and this larva was feeding from the moth larva. Soon a small larva was found between the first pair of true legs of the prey.

Each continued to feed without leaving its respective position for three days more, during which time the ichneumonid grew faster than did the wasp larva. On the evening of October 14th, the ichneumonid left its original feeding place at the anterior part of the body, moved back and attacked the living wasp larva. Its head soon became attached to the side, near the center of the body, while the attacked wasp larva still held onto its prey.

The following morning nothing but a limp skin of the wasp larva remained, the head still at its first position on the fourth abdominal segment. The ichneumonid was feeding again, at this time on the remains of the moth larva, the original prey. By mid afternoon almost all of the moth larva had been eaten with the exception of the skin and the hard parts of the head and legs. By evening the parasite had spun a few strands for its cocoon, which by morning had been increased and supplemented by an apparently complete cocoon of the insect.

It would be interesting to learn whether or not the wasp larva ever destroys the larva of *Paniscus* under the conditions as outlined above. As far as my observations go, the wasp larva has always been destroyed and devoured by the ichneumonid. The number of wasps destroyed each season must be great and the ichneumonid must constitute a serious menace to its increase in numbers.

Cushman[4], in an excellent and interesting account of some types of parasitism among the ichneumonidæ, reviews a number of records of habits in certain species of the genus *Paniscus*. This paper considers parasite and host relationships, the egg of *Paniscus* and its development, growth and change in the larva and other pertinent and important points.

The host, in the instances recorded, has always been a lepidopterous larva. He states (p. 40) that: "In *Paniscus* and very likely in all the parasites of this type the attack of the parasite is made on nearly or quite full-grown larvæ, which thereafter burrow into the ground (presumably,) or some other medium for pupation."

Edgar A. Dodge

It is with sincere regret that we chronicle the passing of our friend, Mr. E. A. Dodge of Santa Cruz, California, at the ripe age of nearly eighty years. Through all his long life he was actively interested in the study of the North American Lepidoptera. During his earlier years he collected at or near his home at Louisiana, Missouri in collaboration with his brother, G. M. Dodge. Together they became interested in the genus Catocala and accumulated a very complete series of the American species of those beautiful moths. With his brother he also became much interested in the Hesperidæ or "skippers" and in time secured a fairly complete series of the North American species.

Mr. Dodge's removal to Santa Cruz about 1909 did not lessen his interest in the Lepidoptera and in his later years, in collaboration with Mr. John Strohbeen, he turned his attention to the collection of the butterflies and moths of Santa Cruz County, in which work he was actively engaged up to the time of his death. His collection, including the valuable material taken during his early life in the middle west, he left to the California Academy of Sciences, to whose collection of insects it will make a most valued addition.—E. P. Van Duzee.

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[4] Cushman, R. A. Some Types of Parasitism Among the Ichneumonidæ. Proc. Ent. Soc. Wash., Vol. 28, pp. 38-40, 1926.

NOTES ON PHALÆNIDÆ* FROM ARCTIC AMERICA, SUPPLEMENTED WITH MATERIAL FROM HIGH ALTITUDES

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The notes and descriptions in this paper are the result of identification of specimens submitted by Mr. J. R. Malloch for Mr. Owen Bryant.

Five generic and sixteen specific names are discussed, one specific name is placed in synonymy, four specific names are placed as representing subspecies, one specific name is removed from synonymy, and six new species and four new varieties are described, one of the latter representing a species not heretofore recorded from North America.

ALA PICTETI Staud.

1882, Staudinger, Stett. Ent. Zeit., p. 49, *Ala.*

A single specimen labeled "Siberia" is in the National Museum. The fore tibia bears two long spines near the distal end with another long spine a short distance above, and the outer side of the tibia is fringed with exceedingly long hair tending to droop over and hide the spines. The hind tibia possesses spines for its entire length. The palpus is relatively long, with more scales and less hair than that of *Archanarta.* The antennæ are strongly beaded instead of being serrate or lamellate. The eyes are reniform shaped and hairy. The fore wing has vein 7 shortly stalked with the stem of veins 8 and 9; the hind wing has veins 6 and 7 shortly stalked. The habitus is decidedly Heliothid. The genitalia indicate a very distinct offshoot of the *Anomogyna* series.

ARCHANARTA QUIETA Hbn.

1805?, Hübner, Schmett. Europ., Noct., f. 485, *Noctua.*

1929, Barnes & Benjamin, Bull. B'klyn Ent. Soc., XXIV, 173, *Archanarta.*

1932, McDunnough, Can. Ent., LXIV, 105, *Archanarta.*

Dr. McDunnough appears correct in his contention that *Archanarta* is related to *Anomogyna.*[1] This relationship includes

*Noctuidæ of Authors.

[1] The eyes of *Barrovia* B. & McD., *"Psychorphora" fasciata* Skin. only known species, are sparsely but distinctly hairy, this character usually obscured because of grease. Probably *Parabarrovia keelei* Gibson will also be found to have hairy eyes.

not only a genitalic affinity, but the possession of hair on the eyes, a character heretofore overlooked in the genus *Anomogyna.* While the hairs on the eyes of specimens belonging to the latter genus are relatively sparse, the individual hairs are long and can be discerned without difficulty. Many "agrotids" have obsolescent short hairs on the eyes.

From *Ala* Staudinger *Archanarta* is distinct not only by differences in all the structures of the genitalia, but by the shorter and more hairy palpi, the weaker spining on the hind tibiæ, and the habitus.

A pair of European specimens of *quieta,* those discussed by Barnes & Benjamin, have veins 8 and 9 of the fore wing the only stalked veins, vein 7 being from the discocellulars well below the accessory cell; the hind wing having veins 6 and 7 connate.

ARCHANARTA CONSTRICTA Wlk.

1857, Walker, Cat. Lep. Het. B. M., XI, 701, *Anarta.*

A single North American specimen from Herschel Island, Y. T., (Bryant) has vein 7 of the fore wing shortly stalked with the stem of veins 8 and 9; veins 6 and 7 of the hind wing shortly stalked. While these characters have usually been considered as generic by European entomologists they may not, in the present instance, be of specific significance.

The antennal serrations (almost lamellations) are very slightly heavier on the Bryant specimen than on the European male of *quieta.*

Slight differences exist between the genitalia of these two males, differences which might easily be individual.

Until additional specimens can be obtained for study, the name *constricta* may be resurrected for the North American form, and the name *quieta* restricted to the European.

Archanarta bryanti Benjamin, n. sp.

Similar in habitus to *A. quieta* and at first glance appearing to be a melanistic specimen of that species. The fore wing is smoky black powdered with grayish blue, the markings more or less obsolescent, their position as in *quieta;* the hind wing has a bluish white ground color which is almost obscured by fuscous. Beneath: bluish white, powdered with fuscous which marks the veins.

Easily distinguished from *quieta* and *constricta* by the lack of spines on the fore tibia, and by the simple ciliated antenna.

The present species is possibly worthy of generic separation, but the general habitus of the genitalia suggests a close affinity to *quieta*. From both *quieta* and *constricta* the genitalia differ by having the uncus somewhat more spatulate and with thinner neck, the vinculum broader basally, and the dorsal arm of the tip of the harpe shorter than the ventral arm, the latter character possibly only individual in this group. Expanse, 25 mm. *Type locality:* Aklavik, N. W. T. *Holotype*, male, July 28, 1931, Bryant lot 271, Cat. No. 44311, U.S.N.M.

Anomagyna mallochi Benjamin, n. sp.

Allied to *imperita Hübner*, with which it agrees in all color and pattern characters. The genitalia show no differences which can be considered specific, but the male antennæ are much more heavily serrate (or lamellate) than those of the Labrador to Rocky Mountain species. Expanse, 34-38 mm.

Type locality and number of sex types: Holotype, male, Aklavik, N. W. T., July 24, 1931; five male *Paratypes*, same data; three male *Paratypes*, Aklavik, July 15, 1931; all taken by Owen Bryant. Type and three paratypes in U.S.N.M., five paratypes returned to Mr. Malloch. Cat. No. 44312, U.S.N.M.

Anomogyna mallochi arufoides Benjamin, n. var.

Superficially appearing to be quite a distinct species, but probably only a melanistic form, as the antennæ and genitalia agree with those of *mallochi*.

Fore wing smoky, lacking all red tints, and possessing a broad black band suffusing the outer half of the medial area below the reniform to the transverse posterior line. Expanse, 37 mm.

Holotype male, Aklavik, N. W. T., July 24, 1931, (Owen Bryant). Cat. No. 44313, U.S.N.M.

Anomogyna mallochi stejnigeri Benjamin, n. subsp.

Possibly a distinct species, but the antennæ are so similar to those of *mallochi* that a subspecies is indicated.

Fore wing pale chocolate strongly suffused with purple; the lines and markings similar in shape to those of *imperita;* the transverse anterior line mesially marked by bright purple gray, the orbicular and reniform strongly suffused with purple, a conspicuous purple shading tending to fill the area between the transverse posterior line and the obsolescent subterminal shade. Hind wing with the pale ground heavily suffused with fuscous brown, especially distally and on the veins; with a faint discal dot and

a strong toothed median shade, in this latter character distinct from all closely allied forms. Expanse, 37 mm.

Type locality: Bering Island

Holotype, male, 20 Aug. '83, L. Stejneger, No. 2532. Cat. No. 44314, U.S.N.M.

Anomogyna speciosa Hbn.

The undersides of the male antennæ show lamellations. North American specimens seem to possess somewhat larger eyes, as an average, than European examples.

Anomogyna apropitia Benjamin, n. sp.

Male antennæ composed of beaded segments, neither serrate nor lamellate. Male eyes reduced in size, female eyes subreniform. Superficially the color and pattern are similar to those of *A. speciosa* form *arctica* Zett., but the wings are duller in tint, and the body is slighter in build than the *speciosa* forms. The genitalia are essentially of the *speciosa* pattern. Expanse, Male, 37 mm.; female, 43 mm.

Evidently much like the Asiatic *propitia* Püng., but the antinome of that species in so far as the antennæ are concerned.

Type locality: Banff, Alta.

Number and sexes of types: Holotype, male, *Allotype*, female (ex. Coll. Brooklyn Museum). Cat. No. 44315, U.S.N.M.

Anomogyna aklavicensis Benjamin, n. sp.

Male antennæ very slightly serrate; eyes subreniform; only a single weak spine was found on the inner side of the fore tibia. Markings essentially of the *speciosa* pattern; but the reniform is more erect and less constricted; the fore wing is dull brownish, more or less powdered with gray; the hind wing dull fuscous with obsolescent darker median and terminal shades and discal mark. The underside as in *speciosa* but dull, the markings obsolescent. Genitalia of the *speciosa* pattern. The exact shape of the harpe, clasper, and uncus seems to differ slightly from that of related species. Expanse, 35-38 mm.

Type locality: Aklavik, N. W. T.

Number and sex of types: Holotype, male, July 15, 1931; one male *paratype*, same date; one male *paratype*, July 24, 1931. Collected by Owen Bryant. Type and one paratype in U.S.N.M.; Paratype returned to Mr. Malloch. Cat. No. 44316, U.S.N.M.

ANOMOGYNA MUSTELINA Sm.

1900, Smith, Proc. U.S.N.M., XXII, 469, *Hadena.*

occidens Hamps.

1913, Hampson, Ann. Mag. Nat. Hist., (8), XII, 588, *Aplectoides.*

The Smith type is in the National Museum and is labeled "Santa Cruz Mts., Cal." Hampson described *occidens* from Sicamous, B. C. Some years ago, at the author's request, Mr. W. H. T. Tams compared a specimen from Wallace, Idaho, with the Hampson type.

ANARTA RICHARDSONI Curt.

1834, Curtis, Ross' Narr. Second Voy. N. W. Pass., app. LXXII, pl. A, f. 11, *Hadena.*

algida Lef.

1836, Lefebure, Ann. Soc. Ent. Fr., V, 395, pl. X, f. 5, *Anarta.*

No essential differences were found between the genitalia of several of the so-called species of the *richardsoni* group of *Anarta.* Slight individual differences in the exact shape of the claspers and the harpes indicate a variable species.

A male type of *richardsoni* is in the National Museum having descended through Doubleday, Guenée, Oberthür, and Barnes. Greenland specimens representing a manuscript Bang-Hass name are of the same form as the type of *richardsoni.* This is a form with the fore wing lacking all orange and most of the olive tints; the disc of the hind wing paper-white, occasionally soiled with fuscous. The only specimen of European *algida* in the Museum is a faded female. This example much resembles the type of *richardsoni.* For the present the normal European synonmy will have to stand.

ANARTA RICHARDSONI SEPTENTRIONIS Wlk.

1857, Walker, Cat. Lep. Het. B. M., XI, 700, *Anarta.*

This "species" was described from Repulse Bay. Mr. Tams has been unable to match the type which probably represents a local race of *richardsoni* from the vicinity of the Melville Peninsula.

ANARTA RICHARDSONI FEILDENI M'Lach.

1878, M'Lachlan, Jour. Linn. Soc., XIV, 112, ?*Mamestra;* p. 122, *richardsoni* var., *Anarta.*

1890, Aurivillius, Bih. K. S. Vet.-Akad. Handl., XV, 19, *richardsoni, Anarta.*

1905, Hampson, Cat. Lep. Phal. B. M., V, 611, (unrecognized), ?*Ala.*

1925, McDunnough, Can. Ent., LVII, 307, *richardsoni* var., *Anarta.*

Mr. Tams has examined the first specimen listed by Hampson (l.c., V, 40) under the name *richardsoni,* and concerning this example writes: "The type of *M. feildeni* was, as you say, entirely missed by Hampson, but I have carefully labeled its type myself."

The description indicates a local form related to *languinosa.*

ANARTA RICHARDSONI LANGUINOSA Sm.

1900, Smith, Proc. Wash. Acad. Sci., II, 492, *Anarta.*

This "species" was described from a male from Popoff Island, Alaska. The type, in the National Museum, represents a subspecies intermediate between the Arctic America to Greenland race *(richardsoni)* and the Labrador race (described herein), showing some orange powderings on the fore wing, but with the disc of the hind wing strongly yellowish tinted, not paper white. Three specimens from Aklavik, N. W. T. (Bryant) show the hind wings as in the type. The fore wing of one example matches that of the type; the fore wings of the other two examples tend to lose the orange scaling and the mossy appearance.

Anarta richardsoni tamsi Benjamin, n. subsp.

This is the Laborador race which is usually called *richardsoni* in collections. Both Smith and Bang-Haas appear to have considered this race a distinct species under the name of *richardsoni.* The superficial appearance is that of a distinct species. The fore wing is usually heavily marked with orange, or occasionally the orange may be replaced, wholly or in part, by strong mossy-green powderings. The disc of the hind wing is paper white, the broad black terminal band not so cleanly demarked mesially as in *richardsoni* and *languinosa.* Expanse, Male and female, 27-35 mm.

Type localities and number and sexes of types: Holotype, male, Hopedale, July 24-31; *allotype,* female, Hopedale, July 8-15; 31 male, 24 female *paratypes,* Hopedale; 20 male, 14 female *paratypes,* Okak; 96 male, 103 female *paratypes,* Nain; 5 male, 4 female *paratypes,* Labrador; all from Labrador, various dates from the last week of June to the third week of August.

Described from 153 males and 146 females, with additional specimens in duplicate. Cat. No. 44317, U.S.N.M. All types

in U. S. National Museum excepting 3 male and 3 female paratypes received from Mr. Otto Buchholz for identification.

ANARTA RICHARDSONI SQUARA Sm.

1908, Smith, Ann. N. Y. Acad. Sci., XVIII (2), 112, *Anarta.*

Described from Greenland. The genitalia, from a cotype in the National Museum, are so like those of *richardsoni* that a variety of that species is indicated. Superficially the coloration and markings suggest the possibility of a valid species. The fore wing has a dull powdery appearance, with some orange scaling, and a disconcolorously darker median area; the hind wing has the disc luteous brown (possibly stained, presumably not).

ANARTA ETACTA Sm.

1900, Smith, Proc. Wash. Acad. Sci., II, 493, *Anarta.*

Judging from the unique female type in the National Museum, *etacta* belongs to the *richardsoni* group. The ground color of the hind wing is white, but much darkened with fuscous; the normal broad black distal band and the black discocellular spots are both absent. The fore wing has the ordinary markings strongly emphasized by white as in Hampson's figure (1905, Cat. Lep. Phal. B. M., V, pl. LXXXVI, f. 4), which otherwise is not good. A valid species is indicated.

ANARTA MAGNA B & Benj.

1924, Barnes and Benjamin, Contrib. Nat. Hist. Lep. N. Am., V, (3), 117, *Anarta.*

Only the two females cited in the original description are before the author. The species may be distinguished from its allies in the *richardsoni* group by the black bar connecting the discocellular spot with the wing base on the underside of the hind wing. This character is not duplicated in over three hundred specimens belonging to other species in the same group, although the type and paratype of *magna* were collected with a time interval of some twenty or thirty years. The holotype was collected at 13,000 feet altitude on Bullion Peak, Colo., by Mr. George P. Engelhardt; and the paratype, labeled "Colo. Bruce," probably came from the same locality.

Anarta preblei Benjamin, n. sp.

Belongs to the *leucocycla* group, but superficially resembles a small *richardsoni.* Fore wing fuscous brown heavily powdered

with black, and with a suffusion of olive green and bluish white; basal and transverse anterior lines obscured by the black powdering; the orbicular mainly as a bluish white suffusion with blackish powderings; reniform small, similar to the orbicular but with noticeable black outlines; cell filled with black; claviform black, basally continued by two black bars, the interspace olive green; transverse posterior line black, produced to points on the veins, excurved around the cell, thence incurved; followed by a bluish white powdering; subterminal shade black, diffused; a strong black terminal line of dots extending onto and checkering the white fringe. Hind wing with the disc white, heavily powdered with black, which obscures the area from mesad of the strong black discal spot to the inner margin; an obsolescent powdery black thin medial line, the terminal third of the wing occupied by a powdery black band which is intensified into a terminal line; fringe white. Beneath: Fore wing bluish white powdered with black scales, with black discal spot, a black spot marking the transverse posterior line on the costa, and a subterminal blotchy line; terminal line and fringes as on upper side. Hind wing much as on upper side but with the bluish white disc more extended, the terminal band narrower and more suffused, and with a strong black bar connecting the discal spot with the base of the wing. Expanse, 27 mm.

Type locality: St. Paul Island, Bering Sea.

Holotype, male, summer 1914, E. A. Preble. Cat. No. 44318, U.S.N.M.

Apatela acla Benjamin, n. sp.

Wing shape and color of hind wings as in the female of European *myricæ* Gn.; related to *distans* Grt. and *impressa* Wlk. Eye small, practically reniform. Thorax and abdomen clothed with a mixture of black, white, and bluish scales, intermixed with hairs and hairlike scales. Fore wing with the ground color blue-gray, powdered and marked with rich jet black; the transverse anterior line indicated on the costa, lost in a black smudge extending from near the base of the cell, circling to the lower side of the black basal dash, thence through the submedian region to the inner margin and extending distad to about the middle of the submedian interspace; orbicular small, round, black-outlined, with a small black central dot; reniform strongly curved, black-filled save for a few blue-gray scales; transverse posterior line black, geminate, filled with the ground color, its course as in *impressa*; subterminal line pale blue-gray, distally marked by small black sagittate dashes; terminal line black, thin; fringe checkered black and white. Hind wing almost uniformly dull smoky; the fringe faintly checkered by brownish white. Underside nearly uniformly suffused with fuscous; the hind wing with some bluish powdering on the

disc and a black discal mark connected to the base of the wing by a black bar; fringes as on the upper side. Expanse, 32 mm.

Type locality: Aklavik, N. W. T.

Holotype, female, July 1, 1931, (Owen Bryant). Cat. No. 44319, U.S.N.M.

AUTOGRAPHA (SYNGRAPHA) INTERROGATIONIS L.[2]

1758, Linnæus, Syst. Nat., ed. X, p. 513, *Phalæna Noctua.*

Two examples labeled "Groenland" ex Oberthür Collection superficially appear to be the form called *borealis* by Reuter, or are closely allied thereto.

Staudinger's description of *grönlandica* indicates a species with the silvery dentate but erect lines of the *u-aureum* group. Aurivillius' figure and synonymy are probably correct. (1890, Bihang K. Vet.-Akad. Handl., XV, Afd. IV, No. 1, p. 16, pl. I, f. 7).

Hampson's figure of "*groenlandica*" (Cat. Lep. Phal. B. M., XIII, pl. CCXXXVI, f. 23) is based on a specimen from Iceland, and much resembles the form of *interrogationis* labeled "Groenland" in the National Museum, differing mainly in the shape of the stigma and the coloration of the base of the hind wing.

A series of specimens from Finland, Scandinavia, Iceland, and Greenland will be necessary to solve this riddle. The genitalia of specimens of *interrogationis* from central Europe are much like Pierce's figure (1909, Genit. Noct., pl. XXIX); but the clavus of the Greenland form is somewhat more lobate and less elongate. Minor differences, which probably are not constant, exist in the exact shapes of the harpes. Lack of material from Finland and Scandinavia prohibits checking on these characters.

Autographa interrogationis herschelensis Benjamin, n. subsp.

Superficially differs from *interrogationis* (from central Europe) by having the fore wing suffused with purplish blue-gray. The reniform is elongate and narrow, so constricted as to appear almost an elongate figure 8. The U-shaped stigma is tailless, but distally there is a small silver dot not on a line with the bottom of the "U," but opposite the center of this mark. The genitalia have the clavus similar to that structure in the Greenland specimens. Slight differences exist in the exact shape of the harpe,

[2] No other North American records for this species or any of its varieties are known to the author.

and in the clasper, which bears an additional disto-central point in the present form.[3]

The present subspecies must be similar to *transbaikalensis* Staudinger (1892, Iris, V, 371) from south-central and south-eastern Siberia, but the hind wings of the North American form are not noticeably different from those of specimens from Europe, the fore wings possess the disconcolorous medial areas, and the shape of the stigmæ appears different. Expanse, 38 mm.

Type locality: Herschel Island, Y. T.

Holotype, male, July 18, 1930 (Owen Bryant). Cat. No. 44320, U.S.N.M.

Insect Notes

The following observations are from the files of the State Department of Agriculture:

Paraneura simulella Dietz. This Tineid, which superficially resembles the Œcophorid, *Borkhausenia pseudospretella* Staint, has been reared from Tulip Bulbs. The moth itself is not uncommon in California.

Homœosoma electellum Hulst. What Heinrich thinks may be variety *opalescella* Rag., appeared in quantity throughout the lower Sacramento Valley in 1932. Larvæ were quite injurious to sunflower heads in several localities. Previous to 1932 no individuals could be easily found.

Andrena flavoclypeata Sm. We have had this bee submitted a number of times from Sacramento lawns. The adults are active in March and may be very locally numerous, piling up many small mounds of earth throughout the grass.—H. H. Keifer, Department of Agriculture, Sacramento, California.

[3] The two latter characters may have little or no significance. They are noted because they exist in the unique type.

ON FIVE SPECIES OF DIPTERA, NEW AND OLD

BY M. C. VAN DUZEE

Buffalo, New York

Hypocera californica Van Duzee, n. sp.

Female: Length 3 mm. Head (Fig. 1.) black; front shining, as wide as from the tip of antennæ to vertex; palpi yellow, almost orange yellow, with stout bristles; proboscis yellowish brown; antennæ and eyes reddish brown; antennæ almost round, arista nearly apical, long and delicate with short pubescence; front with two small, reclinate bristles on inner side of each antenna, the upper one near tip of antenna; above these there are three rows of four long bristles each; below each antenna with three proclinate curved bristles; vertex scarcely rounded upward; lower bristles on posterior orbit black.

Thorax and scutellum shining black, the former with four bristles of nearly equal length. Abdomen with first three segments black, their posterior margin very narrowly yellow, second segment not much elongated, scarcely as long as wide; fourth narrow, black with posterior margin yellow on the sides; fifth and sixth wholly yellow on the dorsum, seventh yellow, blackish along the median line; eighth black, long, forming part of the ovipositor.

Coxæ yellowish, sometimes largely blackened; femora, tibiæ and most of tarsi yellow; fore tibiæ with one moderately large bristle at the middle above; upper surface of middle tibiæ with a pair of large bristles at basal fourth inserted close to each other, and a row of close-set, stiff black hairs on whole of upper edge; posterior tibiæ above with a pair of long bristles near basal third, one of which is distinctly nearer the base than the other, and a single large bristle at apical third; length of fore and middle tibiæ each as 48, of posterior pair as 78; joints of fore tarsi as 17-10-9-7-9; of middle as 29-16-14-10-9; those of posterior pair as 41-26-17-13-10; first joint of hind tarsi with spines below for their whole length. Knobs of halteres black, more yellow below and at base, their petiole yellow.

Wings nearly hyaline, veins yellow, costa yellowish and ciliate with rather long, stiff, black hairs; fourth vein distinctly detached from third at base and nearly parallel with it for a short distance at base; seventh vein distinct and nearly reaching the wing margin.

Described from three specimens, one of which seems to be a male, but the tip of the abdomen is injured. Holotype, female, No. 3703, Mus. Calif. Acad. Sci., and two paratypes, were taken by Mr. E. C. Johnston, July 30, 1932, at Petaluma, Sonoma County, California, who found them flying in and out of a gopher

hole. Presented to the Academy by Mr. A. Christofferson.

This seems to come nearest to the eastern *clavata* Loew of any North American species in the color of the antennæ, palpi and legs but that species has the hind femora "very black", the abdomen wholly black and the tip of the third vein dialated; in this the tip of third vein is very thin, hind femora wholly yellow and abdomen marked with yellow.

Parasyntormon utahnum Van Duzee, n. sp.

Male: Length 2.7 mm. Face covered with white pollen, moderately wide, slightly wider above; front brown pollinose, almost opaque; palpi white pollinose, rather small with very minute white hairs; antennæ (Fig. 5) wholly black, first segment twice as long as wide at tip, second overlapping third for nearly half its length, third segment three times as long as wide, its sides parallel or nearly so, tip nearly truncate with rounded corners and a small, median notch, arista inserted at middle of upper edge, not quite as long as antennæ, lower orbital cilia pale.

Dorsum of thorax green with brown pollen, which leaves a polished median stripe that is brown in the middle and green on each side; acrostichal bristles in an irregular row; abdomen green, hair on first segment pale, on second black; bristles on sides of first segment long, bristles of first and second segments black; hairs on remainder of the abdomen mostly black; hypopygium quite conspicuous, its outer lamellæ as long as the height of the hypopygium, black, yellow at base.

All coxæ yellow with most of anterior surface of front pair and outer surface of middle and hind pairs black, hair on all coxæ black; all femora and tibiæ yellow; front and middle tarsi yellow at base, black from tip of first segment; hind tarsi wholly black; first segment of front tarsi (Fig. 6) with three long bristles below on basal half that slightly increase in length, second segment widened below; front tibiæ with one bristle above near middle; front femora with several long black hairs below; middle tibiæ with one bristle above near basal third and one near tip, none below; hind tibia with one large bristle on upper posterior surface and several smaller, recumbent ones on upper surface, also a small one below at apical third; length of front tibiæ as 46; middle as 70 and posterior as 85; segments of front tarsi as 26-12-8-8-6; of middle pair as 33-19-14-11-9; those of posterior pair as 22-28-18-13-10. Calypters and halteres yellow; cilia of former black. Wings in type in poor condition.

Described from two males, taken by the author, May 21, 1926, at Saltair, Great Salt Lake, Utah. Holotype, male, (No. 3704) in the California Academy of Sciences.

Of four species with third antennal segment formed somewhat alike, Wheeler described *emarginatum*, which has a distinct subapical offset on both upper and lower edge, between which projects the rather slender, acutely pointed tip, the arista being inserted above near the tip at the offset. Two males of *emarginatum* were taken at Saltair with these *utahnum*. Curran described *emarginaticornis* from Alberta having the first two antennal segments yellow below, third twice as long as wide and distinctly concave at tip, and later *longicornis* Van Duzee was described from Oregon, with only first antennal segment yellow below on apical half, third segment three times as long as wide, slightly oblique at tip, with the arista at basal fourth. The present form has the antennæ wholly black, third segment three times as long as wide, apex with a small V-shaped notch in the middle, and the arista at the middle of upper edge.

Sciapus unifasciatus Say.

Say, Jour. Acad. Nat. Sci. Phil., III, p. 85; Wiedemann, Auss. Zw. Ins. II, p. 219, changes the name to *sayi*, but apparently without cause.

The following notes on the male seem to be needed: First two antennal joints yellow, third black or dark brown; coxæ, femora and tibiæ wholly, and tarsi mostly, pale yellow; tarsi plain; first two abdominal segments wholly yellow in the male, in the female the first and basal half of second segment yellow; hypopygium small, yellow, its appendages small, black. Wings slightly tinged with yellow in front of third vein; costa and veins mostly yellow when viewed against a dark background; third vein running close to second to a point opposite the fork of fourth vein, from there it is greatly arched backward; cross-vein very oblique, nearly parallel with hind margin of wing, its length as 45, last segment of fifth vein as 18; fourth vein from the cross-vein to the fork as 36, from fork to wing margin as 19; costa ciliated with long bent bristles.

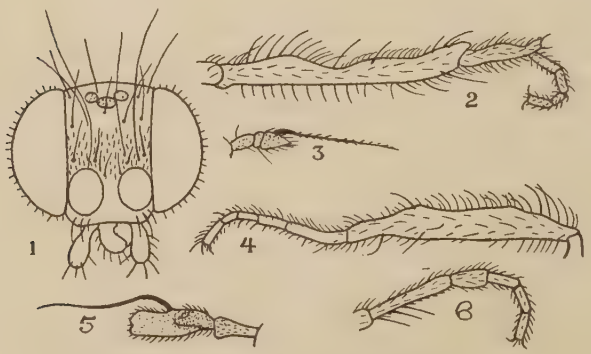
Thinophilus prasinus Johnson

Occasional Papers, Bost. Soc. of Nat. Hist., Vol. V, p. 13, Nov. 9, 1921.

A series of seven specimens in the collection of the Buffalo Society of Natural Science contains both males and females,

probably from near New York City. From a male Mr. Johnson sent me at the time he described it, I am quite sure these all belong to his species although there seems to be considerable difference in the measurements of the joints of the tarsi.

The following characters were not mentioned by him in his description and are common to the specimens in the Buffalo Society collection and the one specimen sent me by Mr. Johnson. The first three joints of fore tarsi each have two long hairs at tip, the first with seven other long hairs; wing veins largely yellow, especially the second and third veins; last joint of both front and middle tarsi distinctly widened. In the male in the Buffalo Society collection the length of front tibiæ is as 52, of middle as 65 and of posterior as 80; joints of fore tarsi as 17-9-8-7-8; longest hairs on first joint as 10; joints of middle tarsi as 29-11-9-6-10, of posterior as 20-18-10-10-4. Length of front tibiæ in the female as 51, middle 72 and posterior as 82; joints of front tarsi of female as 25-8-8-9-6; of middle pair as 38-16-13-10-10; and of posterior as 23-21-16-12-12.



EXPLANATION OF FIGURES

Fig. 1, Head of *Hypocera californica,* n. sp.; Fig. 2, middle tibiæ and tarsi of male of *Campsicnemus nigripes* Van Duzee, the tibiæ appear narrowed something like this in several specimens, probably they are twisted; Fig. 3, antenna of male of same; Fig. 4, normal appearance of tibiæ of same. Fig. 5, antenna of male of *Parasyntormon utahnum* n. sp.; Fig. 6, front tarsi of same.

Campsicnemus nigripes Van Duzee

Entomological News, Vol. XXVIII, p. 126, 1917.

Nigripes was described from a single male which was taken at Sacramento, California. In 1926 I took a series of this species at Boulder, Colorado. The drawings given here are made from these specimens; Fig. 4 shows the middle tibiæ and tarsi normal, the tibiæ and tarsi being wholly black, Fig. 2 shows the middle tibiæ as it often appears, probably because it is twisted, it being very much compressed and thin; the antennæ are pointed at tip (Fig. 3) and wholly black; length of middle tibiæ as 70; joints of fore tarsi as 23-9-6-5-5; of middle pair as 22-8-7-5-8; and of posterior pair as 17-17-11-7-8.

Engytatus geniculatus Reuter

On August 17, 1931, Mr. A. C. Browne, of the State Department of Agriculture, found evidence to indicate that this Mirid produced a peculiar injury on tomato stems in the Whittier district. This injury was in the form of a node-like swelling which had apparently been repeatedly punctured in a circle around the stem. The conducting tissue showed considerable corrosion and a small amount of pressure would cause the stem to break at this point. A little later in the year, a similar injury was noted in tomato plants and correlated with adults submitted from Ventura County. This species, while of a different genus, is rather close to the Tobacco Suck Fly (*Dicyphus minimus* Uhl.) —H. H. Keifer, California Department of Agriculture, Sacramento, California.

AGLAIS CALIFORNICA IN CALIFORNIA DURING 1932

The California Tortoise-shell Butterfly is well known to have periodic cycles of abundance, one of which occurred recently. There are reports of numbers in southern Oregon and extreme northern California in 1931. I observed great numbers in the northern Sierra Nevada from the Truckee road to the vicinity of Lassen Peak, July 6 to August 1, 1932. Numerous larvæ were noted July 6 near Bowman Lake, Nevada County, on a

thicket of Ceanothus. During the ensuing week in this general vicinity and in southern Sierra County the species was not much in evidence. Small numbers of the butterflies were noted along a road south of Sierraville on July 18. The caterpillars and their work was conspicuous in Plumas County about 15 miles west of Blairsden on July 19. On succeeding days near Gibsonville I saw areas, several acres in extent, of *Ceanothus velutinus* which had been entirely denuded of foliage by the larvæ so that only the massed stems of this shrub were seen, giving a general brown effect. During the remainder of the month the butterflies were increasingly common from this region north to Lassen Volcanic National Park. Roadways were often heavily dotted with them and the radiators of passing automobiles were well covered with butterflies. Damp soil beside the road at times was fairly black with resting butterflies showing the under sides of their wings. In Lassen Park there was a constant drift of butterflies fairly close to the ground, during the warmer hours of each day. In the forest near Upper King Creek Meadows on July 29 I estimated 600 per minute were passing through a section 10 feet high between two trees about 50 feet apart. Damp soil on trails often had 10 to 20 resting butterflies per square yard. On the trail up Mount Lassen on July 30 but few butterflies were seen in the earlier hours (a cold s.w. wind blew all morning); by 10 a. m. they were in evidence and by 10:30 a. m. they were streaming up the east slope in myriads. At the summit they were carried here and there by the erratic gusts of wind and some came to grief on the snow. In general, the direction of drift varied according to slope exposure and the prevailing wind, although there seemed to be a tendency to move southwesterly. On the Humboldt Road from Lake Almanor to Chico, August 1, the species was encountered in numbers down near to Jonesville, Butte County. Throughout my contact with the species I did not observe any tendency for birds to feed especially upon it, as was noted by H. C. Bryant at Sisson in 1911 (Condor, 13, 1911, pp. 195-208).—Tracy I. Storer, Division of Zoology, University of California, Davis, November 23, 1932.

CALOCORISCA CALIFORNICA N. SP., AN ADDITIONAL GENUS FOR THE UNITED STATES

(Hemiptera, Miridæ)

BY HARRY H. KNIGHT

Iowa State College, Ames, Iowa

The genus *Calocorisca* Distant was described[1] to include four species, all of which were figured. This was a fortunate circumstance since I find the figures more helpful than the abbreviated descriptions. *Calocorisca villosa*, *tenera* and *antennata* were from Guatemala, while *C. thoracica* was recorded from Costa Rica. Later, in the same volume, Distant (1893, p. 439) described two more species, *C. tenebrosa* from Mexico, and *C. chontalensis* from Nicaragua. Reuter[2] described *Calocorisca æneoinduta* from Venezuela and gave a redescription of the genus which is more complete and useful than the original by Distant. The original description is misleading in speaking of the scutellum as "apex globosely suberect" for the figures do not show it, and the writer agrees with Reuter in stating that the scutellum is only very slightly convex on the apex. Following a study of the figures of Distant's species and the description of the genus by Reuter, I am convinced that the California species before me should be referred to *Calocorisca* Dist. No member of this genus has heretofore been recognized from the United States, hence it is of particular interest to describe a new species from California.

Calocorisca californica Knight, new species

Allied to *tenera* Dist. as indicated by the slightly clavate second antennal segment; distinguished by the short third and fourth antennal segments which taken together just about equal the length of first antennal segment.

Female. Length 8.7 mm., width 3.6 mm. Head: width 1.27 mm., vertex .65 mm.; tylus scarcely visible from above, frons moderately convex, sloping rapidly downward, vertex ecarinate although with a basal line indicated, eyes nearly in contact with collar above but sloping forward somewhat below; as viewed from the side the outline of tylus and frons forming an arcuate line, the tylus moderately indented at base, facial angle practically

[1] Biologia Centrali-Americana. Hemiptera-Het., I, 1884, p. 280.
[2] Ofversigt af Finska Vetenskaps-Soc. Forhandlingar, XLVII, 1904-1905, No. 20, p. 20, fig. 9.

a right angle. Rostrum, length 2.51 mm., reaching to near hind margins of middle coxæ, yellowish brown, apex black. Antennæ: segment I, length 1.09 mm., cylindrical, thickness .19 mm., clothed with rather short, black, bristle-like hairs, reddish yellow to brownish; II, 2.98 mm., slender at base (.11 mm. thick), tapering to moderately clavate on apical half (.21 mm. thick), clothed with black, bristle-like hairs and intermixed with some very fine pubescence, pale reddish, apical one-fourth blackish; III, .64 mm., slender (.08 mm. thick), yellowish, apical half black; IV, .39 mm., blackish, pale at base. Pronotum: length 1.73 mm., width at base 2.94 mm.; disk broadly and evenly convex, calli slightly convex, collar somewhat flattened, stricture distinct; disk impunctate, transversely rugulose; uniformly dull yellowish, median ray just behind inner angles of calli and triangular spot between anterior angles and the collar, black. Mesoscutum moderately exposed, scutellum evenly and rather strongly convex, sloping off rapidly behind to a low apex, yellowish, lateral edges and median ray on basal half, black.

Dorsum clothed with recumbent, fine sericeous, golden yellow pubescence, and intermixed with more erect, short, black hairs. General coloration yellowish to brownish and tinged with reddish, more reddish on corium, disk and apex of cuneus, the apex of cuneus sometimes black. Membrane uniformly fusco-brownish, veins paler. Legs yellowish and tinged with reddish, with short, black pubescent hairs; tibial spines black, short, length of spines not equal to thickness of segment; tarsi fuscous to black. Venter yellowish and tinged with reddish, a lateral line formed by glabrous, impressed black spots, one spot on each segment.

Male. Length 7.7 mm., width 3.03 mm. Head: width 1.17 mm., vertex .56 mm. Antennæ: segment I, length .95 mm.; II, 2.6 mm., clavate like the female; III, .58 mm.; IV, .39 mm.; segment II dark reddish to black. Pronotum: length 1.47 mm., width at base 2.6 mm. Very similar to the female in form, color and pubescence. Left genital clasper nearly cylindrical, curved to fit the segment wall, tapering apically to more slender; right clasper ligulate, apical one-fourth curved slightly upward, ending in a recurved tiny hook.

Arolia typical of the Capsinæ, general form of body and pubescence exhibiting affinities with *Pycnocoris* Van D., however the antennæ more slender, body more elongate and scutellum more evenly convex; the general aspect suggestive of a form that should be placed between *Calocoris* Fieb. and *Pycnocoris* Van D.

Holotype: ♀ June 13, 1928, Forest Home, San Bernardino Co., California (E. C. Van Dyke); type No. 3698 California Academy of Sciences. *Allotype:* Male, July 27—Aug. 1, 1915, Kern Lake to Rock Creek, Tulare Co., California, alt. 6250-7000

ft. (J. C. Bradley); Cornell University collection. 3♂ 6♀, taken with the holotype, the males in teneral condition and not fit for type selection. Female, taken with the allotype. 2♀ June 5, 1909, Pasadena, California (Grinnell).

LAMPETHUSA NICHOLI, A NEW SPECIES FROM ARIZONA AND TEXAS

(Hemiptera, Miridæ)

BY HARRY H. KNIGHT

Iowa State College, Ames, Iowa

Lampethusa nicholi Knight, new species

Differs from *anatina* Distant in the smaller size and shorter antennal segments, length of segment I scarcely exceeding width of head across eyes.

Male. Length 3.6 mm., width 1.8 mm. Head: width .88 mm., vertex .36 mm. Rostrum, length 1.35 mm., nearly attaining posterior margins of hind coxæ, brownish black. Antennæ: segment I, length .87 mm., flattened, width .23 mm., thickness .05 mm., outline oblong-oval, narrowing more rapidly at base than apex, dark reddish brown, spotted with rather small white dots, black pubescent, more densely pubescent on the thin edges, a few white bristle-like hairs arise from the white dots; II, 1.04 mm., slender, cylindrical but slightly thicker toward apex, blackish, yellowish brown on basal half except narrowly at base; III, .47 mm., slender, pale yellowish, fuscous on apex; IV, .56 mm., fuscous. Pronotum: length .99 mm., width at base 1.49 mm.; calli appear like triangular, impressed, opaque black spots. Mesoscutum only slightly exposed, scutellum evenly convex, sloping gradually from base to a low apex.

Dorsum clothed with moderately abundant, sericeous, white pubescence, intermixed with pale to dusky pubescence, corium and cuneus with some black hairs. General coloration dark brown or fuscous brown; median line of scutellum except base and spot each side on basal line, narrow median line on pronotal disk and spot each side near middle, anterior to calli except laterally, dorsal aspect of collar largely, marks on frons, and streaks and spots on hemelytra, pale; cuneus more reddish brown, with three or four white spots on disk. Membrane uniformly fuscous, a narrow, transverse pale band behind cuneus; veins fuscous, cubitus paler about apex of larger areole. Legs reddish brown and varied with pale; coxæ white, tipped with reddish; femora with numerous pale spots, many of which coalesce, hind pair paler, the reddish brown reduced to reticulations inclosing pale spots; tibiæ reddish brown,

with broad pale band at middle, hind pair without pale band, having small white dots only, from which arise pale spines and bristles; tarsi pale, darker at base and apex. Ventral surface reddish brown and varied with paler; epimera largely, ostiolar peritreme, posterior edges of ventral segments, and two curving, oblique marks laterally on each ventral segment, pale or white; genital segment with a prominent blunt tubercle above base of left clasper.

Female. Length 4.3 mm., width 1.9 mm. Head: width .87 mm., vertex .40 mm. Antennæ: segment I, length .91 mm., width .25 mm.; II, .87 mm.; III, .48 mm.; IV, .65 mm. Pronotum: length 1.04 mm., width at base 1.51 mm. Somewhat more robust but otherwise very similar to male in form, color and pubescence.

Holotype: Male, April 28, 1925, alt. 4500 ft., Baboquivari Mts., Arizona (A. A. Nichol); author's collection. *Allotype:* Female, Sept. 2, 1928, alt. 3300 ft., Rincon Mts., Arizona (A. A. Nichol). *Paratypes:* Male, taken with holotype; 3♂ 1♀, taken with the allotype; male, July 2, 1917, Uvalde, Texas (H. H. Knight).

Lampethusa anatina Distant. I have examined specimens of what I take to be this species, from Texas, Nicaragua and the Canal Zone. It is distinguished from the above new species by the larger size, the length of first antennal segment distinctly greater than width of head across eyes.

Insects at the California Academy of Sciences

The Department of Entomology of the California Academy of Sciences is maintaining a steady growth. Forty-five thousand specimens were added during 1932, the largest single item being the Millard C. Van Duzee collection of Diptera. This collection was largely of species of the eastern United States, a fauna but poorly represented in the Academy collection. It is especially strong in certain families generally but imperfectly represented in collections, such as the Tipulidæ, Mycetophilidæ and Dolichopodidæ, in the latter family being one of the most complete in the country. The total number of mounted specimens now in the Academy collection of insects is 925,000.—E. P. Van Duzee.

ANOTHER RARE BUTTERFLY

BY JAMES EDWARD COTTLE

Hayward, California

The flattering success which crowned my collecting trip of July, 1931, upon which I located some of the more rare butterflies, determined me this July, 1932, to search out a species over which for a long period much confusion has arisen. I refer to *Argynnis behrensi.*

In many collections I have noted *Argynnis* labeled "*Behrensi,*" but not a specimen corresponded in detail to the *Argynnis behrensi* pictured in Edward's works on Lepidoptera, nor did they tally with descriptions which this famed entomologist gave of them.

Accompanied by the Rev. Edward Guedet, my companion of many previous collecting trips, I journeyed this time to the fog-kissed cliffs and sea-washed shores of Mendocino County and on to Mendocino City, arriving there July 3rd to find King Fog supreme in high command. Meals likewise elevated as to price, beds scarce, with slim chances at the auto camp for parking even Corpus delicti. Finally we secured two rooms at a private house.

As the sun appeared we donned our hunting garb and proceeded to the Point, a strip of land extending from the city to the ocean for approximately half a mile. The devastating hand of Man was here everywhere in evidence. Trees, shrubs, flowers and all verdure had been erased and fields of grain grew in their place. Thus The Point yielded nothing, our two days lost we packed our paraphernalia and started down the coast for Point Arena, Mendocino County, where clouds and dense fog obscures the sun five days a week.

Here we put up at an auto camp cabin and made inquiries for a tile camp; our instructions being to follow a canyon which ran through the town for about four miles toward the mountains. We were told that fires had burned over this section no less than three times in the last decade, wiping out, of course, all traces of the camp in question.

Starting up the canyon we were beset on every side and at every step by as fine and large a growth of volunteer nettles as I have yet encountered. We hunted this canyon for two days. Finally on the third day we ascended the hills where I netted some specimens of *Talides* (*Polites* Auct) *sonora*, form *siris*. Edw. and here it was upon this hillside that one of the strangest freaks which coincidence has ever played in my career occurred. As my companion, the Rev. Edward Guedet called to me, I thought I heard the sound of laughter. So real and so pronounced was it that I paused and listened, but it was not repeated. Father Guedet and I were alone on the hillside. Then in the silence which nature gives to these secluded slopes the thought occurrd to me: "Could it have been the voice of old Jim Behrens himself, for whom the butterfly we were hunting had been named?" Old Jim Behrens, laughing at us from illimitable space. Reaching the Reverend Father I found him imprisoning two specimens just caught, in his poison jar, a pair, a male and female, of *Argynnis behrensi*. Our goal was reached, we captured in all nineteen specimens. Since we had located them, could we have remained another day we would have taken many more specimens, but conditions at home necessitated our departure next day.

Strange world, and stranger still the unsolved mysteries of the human mind. That mystic attribute had brought the old collector's name to me at the very moment when the butterflies named for him were being captured. Can it be possible that the old fellows, Behr, Rivers, Mueller, those who have tramped the trails we trod, with net in hand are guiding our footsteps to where long lost specimens may be found? I wonder.

And I wonder also, if when I am doing my collecting in another sphere, I shall be given the power to guide the younger feet which follow mine along the trails I've trod, to laugh at them as old Jim Behrens laughed at me, and lead them from my unseen hunting grounds into the vale of nettles we passed through? That's when I would laugh.

TWO NEW CALIFORNIA BUTTERFLIES

(Lepidoptera, Rhopalocera)

BY CHARLES H. INGHAM

Los Angeles, California

Ascia beckerii Edw. gunderi Ingham, new tr. form

Both upper and under sides showing the black cell spot on primaries fused outwardly, as well as inwardly, along the confines of the veins of the cell area; the extremities of the black fusing forming elongated points which extend half the length of the spot itself beyond its usual confines. An extra and separate dash appears at the junction of the median vein and the median nervule No. 1, this dash pointing inward, and being more pronounced on the under surface. The white center of the spot in the discal cell of the primaries present as in typical specimens, all other markings, including the green design of the under side of the secondaries normal. Similar in appearance, but not so well developed to P. *daplidice* L., tr. f. *rondoui* Obth., as illustrated in Rhopalocera Palæarctica by Dr. Roger Verity, plate XXX, figures 12 and 13.

Transition form classification: melanifusism, the final degree for this species being at present unknown.

Holotype ♀; expanse 35 mm.; Bouquet Canyon, Los Angeles County, Calif.; from larvæ, emergence date June 21, 1932. Bred from larva by author, and not subjected to any special environment. Type deposited in the Type Collection of the California Academy of Sciences at San Francisco, Calif.; named after my very good friend, Mr. Jeane D. Gunder of Pasadena, California, whose classification of lower lepidopterous concepts is appreciated.

Anthocharis sara Bdv. gunderi Ingham, new race

For several years it has been rumored that a new race of *Anthocharis sara* was to be found on the islands off the coast of southern California, and from Santa Cruz Island in particular. In March of this year a trip was taken by the author to Santa Catalina Island and a small series of these was taken, also other specimens were received by me from two resident collectors. From study of this series, and comparison with hundreds of *Anthocharis sara*, and forms of *sara* taken in California, Arizona, Utah, and Washington, this race, in my opinion, is constant and different enough to deserve special designation.

Race *gunderi* is smaller than our common race *reakirti*. (Most West Coast collectors rank *reakirti* as a race, rather than a seasonal form.) In size, they are as small as typical *reakirti* taken in Chino Canyon and Whitewater Canyon, Riverside County, California. On the upper side, the males have an unusually heavy black bar below the apical patch, the outer marginal black spots on nervules of the secondaries are also strongly marked. In both sexes, the greenish-black marbling on the under side of the secondaries dense, and evenly distributed, being heavier than in *reakirti* As in all races of *sara*, the females of *gunderi* show the greatest divergence. The apical area around the orange spot is unusually black in the female of this race, this being caused by the submergence of the short row of white spots just above the orange spot, there remaining mere indications of white points, also the black extends down to the inner angle of the primaries, and is strongly developed. This feature of the dark apical area will serve to distinguish this race from others, and the small size is also a factor. On all of the females of my series, the secondaries were flushed with a greenish-yellow tinge, not the usual yellowish colors as in *reakirti*. This race of *sara* should be placed next to *reakirti* in all future check lists.

Holotype ♂; expanse 27 mm., April 2, 1932; Middle Ranch, Santa Catalina Island, California. Allotype ♀; expanse 28 mm., same date and locality. These types deposited in the Type Collection of the California Academy of Sciences at San Francisco. One pair of paratypes, matching types, of same date and locality placed through Mr. Foster Benjamin in the United States National Collection, Washington, D. C. One pair of paratypes, matching types, of same date and locality deposited through Dr. J. McDunnough in the National Collection at Ottawa, Canada. One pair of paratypes, matching types, of same date and locality in the author's collection. I take pleasure in naming this *Anthocharis* after Mr. Jeane D. Gunder who so kindly loaned me material from his extensive collection for comparisons with my type lot.

COLLEMBOLA FROM THE STATE OF WASHINGTON

BY H. B. MILLS AND A. R. ROLFS [1]

The Collembola of the Pacific Coast have been studied thus far mainly by Schött (1891, 1896), Bacon (1912-1914) and Folsom (1913, 1916, 1917), although isolated species have been described by MacGillivray (1893, 1894), Canby (1926), and Mills (1931, 1932).

In this paper is included a rather comprehensive list of species collected at and about Yakima, together with a few collections from Western Washington, and scattered references in the literature to collections in the state.

The list, we believe, is quite representative. However, species of certain genera (*Orchesella, Sira*) are conspicuous in their absence. One should look for others of Bacon's and Schött's species described from California, and several additions to the list should result from collections between tide marks on the coast.

A number of species seem to be typical of and restricted to the west coast. Other cosmopolitan forms (*Entomobrya multifasciata* Tull. and *Achorutes armatus* Nic.) are abundantly represented here as they are in any extensive collection.

We have been very kindly allowed to examine Dr. Folsom's forthcoming monograph of the Isotomidæ of North America, and a number of determinations have been made from his manuscript.

A total of 63 species and varieties distributed in 23 genera are recorded.

Order COLLEMBOLA Lubbock

Subfamily PODURINÆ Börner

Podura aquatica (L.) Yakima, February 23, April 19, September 6. Very abundant on surfaces of ponds; also taken under sticks and debris near water.

Subfamily ACHORUTINÆ Börner

Achorutes armatus Nic. Yakima, February 20, 21, 23, October 23. Under decaying vegetation and on soil.

[1] In this paper all determinations were made by H. B. Mills and all collections by A. R. Rolfs, unless otherwise stated.

Achorutes maturus Fols. Yakima, February 19-23, March 16, 23, 24, April 5, 11, 19, August 23, October 22, November 1, 15, 18; Puyallup, October 28 (W. W. Baker). In decaying vegetation and under rocks.

Achorutes pseudarmatus Fols. Yakima, March 22; Port Orchard, October 27 (W. W. Baker). Under rocks and dung at an elevation of 3000 ft., and among decaying potatoes.

Achorutes socialis Uzel. Lake Tipsoe, October 11. Under boards and sticks near water, at an elevation of 5400 ft. This species is primarily a spring form, and its occurrence in October is interesting. The elevation at which it was taken may have some bearing on its appearance.

Xenylla baconæ Fols. Puyallup, April 25. Under leaves and moss-covered sticks.

Xenylla humicola (Fab.) Tacoma, April 26. On the surface of stale pond water. The anal spines in the specimens examined were sufficiently long to cast some doubt as to the identity of the species. They were compared with specimens of *X. humicola* from Greenland which were received from Mr. J. R. Denis, and in all points, save the length of the anal spines, they are comparable.

Xenylla maritima Tull. January 23, October 22. In greenhouse and under boards.

Willemia anophthalma Börner. Yakima, January 23. In greenhouse. This species, represented by the typical form, is here reported for the first time from North America. It is a rather widely spread humus form in Europe and England.

Willemia denisi Mills. Yakima, February 23. In leaf mould. This species is the second to be described in the genus *Willemia*. It has been recorded thus far only from Yakima.

Subfamily NEANURINÆ Börner

Friesia claviseta Axelson. Yakima, February 23. Under boards and sticks near water.

Pseudachorutes complexus (MacG.) This species was described from Washington by MacGillivray (1893).

Neanura muscorum (Temp.) Yakima, April 18, September 6, 7. In rotting wood and under damp leaves.

Neanura gigantea (Tull.) Essig (1926) records this species from

Washington. It is not represented, however, in any of the collections which we have examined from the state.

Subfamily Onychiurinæ Börner

Onychiurus armatus (Tull.) Yakima, February 20. Under boards.

Onychiurus subtenuis Fols. Yakima, April 18; Puyallup, November 11 (S. E. Crumb). In and under decaying wood.

Onychiurus cocklei (Fols.) This species is recorded from Washington by Folsom (1917). It seems to be a typical western form. We have seen it from Corvallis, Oregon, and Moscow, Idaho, but it is not represented in the material studied.

Tullbergia collis Bacon. Yakima, September 7. Under stones imbedded in wet sod.

Tullbergia iowensis Mills. Yakima, January 23. In greenhouse.

Family Entomobryidæ Tömösváry

Subfamily Isotominæ Börner

?Isotomodes productus (Axels.) Linnaniemi. Yakima, April 5. A single specimen of this genus is assigned tentatively to this species. It was accidentally destroyed before it could be completely examined, but it agrees quite well with the figures given by Linnaniemi (1912).

Folsomia diplophthalma (Axelson). Yakima, January 23; Tieton City, November 15. Under boards and leaves, and in greenhouse.

Folsomia fimetaria (L.) Yakima, January 23. In greenhouse.

Folsomia nivalis (Pack.) Lake Tipsoe, October 11. Under rocks, at an elevation of 5400 ft.

Proisotoma aquæ (Bacon). Puyallup, November 11 (S. E. Crumb).

Proisotoma decemaculata Fols. Yakima, February 21. In wet decaying wood.

Proisotoma minuta (Tull.) Yakima, January 24, February 21. Under damp leaves and in greenhouse.

Proisotoma schotti (D. T.) Yakima, January 24. In greenhouse.

Isotoma (*Vertagopus*) *cinerea* (Nic.) Puyallup, November 11 (S. E. Crumb).

Isotoma (*Pseudisotoma*) *sensibilis* Tull. Puyallup, November 11 (S. E. Crumb).

Isotoma eunotabilis Fols. Yakima, February 20-23. In decaying leaves and under boards.

Isotoma viridis Bourlet. Yakima, March 15; Tacoma, April 26; Signal Peak, July 5; Puyallup, November 11 (S. E. Crumb).

Subfamily ISOTOMURINÆ Börner

Isotomurus palustris (Müller). Yakima. January 23; Tacoma, April 26; Puyallup, January 9, 24, April 25, October 28 (W. W. Baker); November 11 (S. E. Crumb). Under logs, in soil and moss, and in greenhouse.

Isotomurus retardatus Fols. Yakima, February 23, April 19, September 6, October 22; Lake Tipsoe, October 11. Under sticks near water and on floating leaves.

Architomocerura crassicauda Denis. Yakima, April 18. Under decaying wood. The discovery of this European species in North America is of passing interest. It was not described until 1931 by Denis from material in Schäffer's collection.

Subfamily TOMOCERINÆ Börner

Tomocerus bidentatus Fols. Tieton City, November 15; Puyallup, November 11 (S. E. Crumb). Under boards and leaves.

Tomocerus flavescens flavescens Tull. Recorded from Washington by Folsom (1913).

Tomocerus flavescens americanus Schött. Yakima, March 15, September 1, 6; Puyallup, April 25, January 9 (W. W. Baker); Lake Tipsoe, October 11. Under stones, leaves and moss up to an elevation of 5400 ft.

Tomocerus flavescens arcticus Schött. Yakima, February 21, 23, March 23, April 18, October 4, 22; Puyallup, April 25, November 11 (S. E. Crumb); Mineral, January 4 (W. W. Baker). In leaf mould, decaying wood, and moss.

Tomocerus flavescens separatus Fols. Puyallup, January 6 (W. W. Baker). In moss.

Tomocerus minor Lubb. This species is recorded from Washington by Folsom (1913).

Tomocerus vulgaris Tull. Yakima, February 23, March 16, 24, April 11, 19, August 23; Puyallup, April 25. Under boards, leaves, rocks, sod, and in rotting wood.

Subfamily ENTOMOBRYINÆ Schäffer

Sinella curviseta Brook. Yakima, January 23, February 23, March 12. Taken under pots in greenhouse.

Sinella binoculata (Schött). Yakima, March 7, April 11. In termite tunnels. This species, described from California, seems to be characteristically termitophilous.

Sinella guthriei (Mills). Yakima, February 13, March 15, September 1, 6, October 20; Puyallup, April 25, November 11 (S. E. Crumb); Lake Tipsoe, October 11. Under sticks and boards, and in rotting wood. *S. guthriei* approaches the European *S. myrmecophila* (Reut.) in the number of eyes. The unguis of the former differs from the figure of Linnaniemi (1912) for *S. myrmecophila* in being longer and more slender, and of different dentition.

Sinella sexoculata (Schött). Yakima, February 19, 20, April 11, 14, March 23, September 1, 23, November 1; Puyallup, April 25. Under boards, leaves, and rotting wood, and among sprouting potatoes in a cellar.

Entomobrya griseo-olivata (Pack.) Yakima, March; Puyallup, March 16, April 11, 19, September 6, 7, 20, 22, 23, 25, November 1. Under sticks, stones, leaves, decaying vegetation, codling moth bands, and swept from grass.

Entomobrya atrocincta Schött. Yakima, April 15, September 17, October 25. Under wood, loose bark, and swept in a net from grass and weeds. Specimens of this species agreeing with Schött's figures and meager description seem to be structurally identical with *E. pseudoperpulchra* Mills. It seems altogether possible that both of these species are synonymous with *E. perpulchra* (Pack.) The falcate mucro of the *perpulchra* type (Mills, 1931, p. 7) may have been an abnormality, for the species seems to agree in all other respects with *atrocincta* and *pseudoperpulchra*. A fourth species, *E. clitellaria* Guthrie, is also close to *perpulchra*; but until a more detailed study of these two can be made, it will be best to keep them separate.

Entomobrya multifasciata (Tull.) This species formed the bulk of the material examined, being represented in almost every

collection, from every locality. Its habitat varied from water-soaked pine logs to greenhouses.

Entomobrya purpurascens (Pack.) Yakima, February 23, March 16, September 6, October 22. Under boards and in leaf mould.

Entomobrya triangularis Schött. Tampico, March; Puyallup, April 25, November 11 (S. E. Crumb); Tacoma, April 26. Under boards, bark, and leaves.

Lepidocyrtus cyaneus Tull. Yakima, January 23, February 21-23, March 16, 23, April 11, 19, September 7, October 22, 23, November 15, 18; Tacoma, April 26; Puyallup, April 25. Under leaf mould, boards, dung, and in soil, rotting wood, and greenhouse.

Lepidocyrtus cyaneus cinereus Fols. Yakima, March 22. Under rocks and dung at an elevation of 3000 ft.

Pseudosinella alba (Pack.) Yakima, March 15, 22, April 5, October 25; Puyallup, April 25. Under stones and dung at an elevation of 3000 ft. Under decaying wood and boards.

Pseudosinella decemoculata (Guthrie). Yakima, April 5, 11, September 1. Under boards, decaying wood, and rocks.

Pseudosinella rolfsi Mills. Yakima, March 22. Under rocks at an elevation of 3000 ft.

Pseudosinella sexoculata Schött. January 23, February 23, March 16, April 5, 11, 19, August 23, October 22, November 1. Under boards, matted vegetation, stones, and in greenhouses.

Pseudosinella violenta (Fols.) Yakima, January 23, February 23, March 12, September 7, November 4, 15; Tieton City, November 15; Puyallup, October 28 (W. W. Baker). Under boards, leaves, and rocks; in greenhouse.

Family SMINTHURIDÆ Lubbock

Subfamily SMINTHURIDINÆ Börner

Sminthurides aquaticus (Bourlet). Yakima, April 19, September 6. On floating leaves and under decaying wood near water.

Sminthurides malmgreni (Tull.) Lake Tipsoe, October 11. Under wet boards and sticks near water. Altitude 5400 ft.

Sminthurinus elegans (Fitch). Yakima, August 23, October 22. Under boards, sticks and matted vegetation.

Sminthurinus niger (Lubbock). Yakima, April 19. Under decaying wood.

Subfamily Dicyrtominæ Börner

Ptenothrix maculosus (Schött). Yakima, September 6, 10, October 4; Spanway, December 31; Mineral, January 4 (W. W. Baker). Under damp leaves, boards, and moss. This species is a rather abundant and exceedingly variable one. It varies from the color form figured by Schött (1891) to a deep brownish red.

Ptenothrix olympius (MacG.) Described from Washington by MacGillivray (1894).

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A NEW BUPRESTID FROM BRITISH COLUMBIA, WITH NOTES ON THE GENUS BUPRESTIS[1]

BY RALPH HOPPING

Vernon, B. C.

The genus *Buprestis* presents a number of problems subsequent to the excellent and comprehensive review of Nicolay and Weiss[2]. One species has been described since 1918 by H. E. Burke[3], one of Col. Casey's species appears to be a perfectly good one and another will be described in this paper. The new species herein described seems to be quite rare. I have waited nearly eight years to collect the six specimens now before me. The notes and conclusions set forth are the result of nearly forty years collecting in which I have endeavored to have each species represented by a large series. Of late years we have been able to obtain a more comprehensive view of the distribution of our species from east to west. The characters are so variable in many species that a large series is necessary in order to obtain a comprehensive idea of the limits of variation.

Buprestis contortæ Hopping, n. sp.

Length 15-18 mm., only moderately convex; dorsal surface bluish green with margins of elytra narrowly bronzed; moderately shining; ventral surface bronze-green.

Head densely, coarsely punctured with sharply defined occipital line; pronotum coarsely, moderately punctured with rather faint broad median sulcation, side margins arcuate, basal margin bisinuate with basal angles acute; prosternum broadly sulcate, elytra distinctly wider than base of pronotum with six entire costæ, one to four with narrow intervals which in the scutellar area have large uniseriately placed pits or punctures, especially in the interval between the short scutellar costa and the suture, apices of elytra rounded to the suture; ventral segments very sparsely and finely punctured, first ventral sulcate, last ventral broadly arcuate on apical margin.

Holotype, male, Midday Valley, Merritt, B. C., July 8, 1923. (R. Hopping), from *Pinus contorta.* Exp. 17053, Lot 1360, No. 3267 in the Canadian National Collection.

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[1] Contribution from the Division of Forest Insects, Entomological Branch, Dept. of Agriculture, Ottawa, Ont.

[2] Jl. N. Y. Ent. Soc., Vol. XXVI, June, 1918.

[3] Proc. Ent. Soc. Wash., XXVI, 1924, pp. 70-72.

Allotype, female, same data, No. 3267 in the Canadian National Collection.

Paratypes, 2, same locality, one July 8, 1923. (R. Hopping), and the other June 30, 1926, (W. Mathers), in the Vernon Laboratory Collection.

Two other specimens, evidently the same species, from Oliver and Kimberley, B. C., are not quite typical as the prosternal process is not or only faintly sulcate.

This species may be separated from *intricata* Csy., *aurulenta* Linn. and *adjecta* Lec. by the number of costæ and the large intercostal pits of the scutellar area.

The four species may be separated by the following key:

A. Elytra with four costæ, all the intervals broad and irregularly punctured, costæ not punctate.....*aurulenta* Linn.
AA. Elytra with more than four costæ, costæ punctate.
  B. Tips of elytra emarginate and usually bidentate, form short, robust and convex; elytra with eight costæ .....*adjecta* Lec.
  BB. Tips of elytra rounded to the suture, form feebly convex.
    C. Elytra with eight entire costæ.....*intricata* Csy.
    CC. Elytra with six entire costæ.....*contortæ* n. sp.

Buprestis intricata Csy.

An examination of Casey's type has convinced me that this species is entirely distinct from *adjecta* Lec. It has not the robust form of *adjecta* of which I have 16 examples before me. The punctation of the head and thorax is much coarser and sparser, the elytra are not so convex and do not represent the brilliant shining effect of *adjecta*. The apices of the elytra are not bidentate or emarginate as in *adjecta*.

I have one specimen taken at Mt. Mitchell, Tulare County, California, at 10,000 feet elevation. Casey's type is bluer than my specimen.

Buprestis rusticorum Kby.

I have before men 122 specimens of this species, ranging from British Columbia to California and the southwest, and have compared these with 29 specimens of *B. maculativentris* Say in my collection and a large series in the Canadian National Collection. Mr. Blair of the British Museum also very kindly

compared a specimen of *rusticorum* with Kirby's type. Not only is *rusticorum* on the average very much larger than *maculativentris* but I find the following differences:

Elytra strongly costate, with intercostal spaces of the disc confusedly punctate, wide, with costæ narrow and sharply defined.....*rusticorum* Kby.
Elytra feebly costate, intercostal spaces of the disc more or less uniseriately punctured, narrow, with costæ more or less flattened.....*maculativentris* Say.

The length of *maculativentris* 14-20 mm. and of *rusticorum* 15-23 mm. given by Nicolay and Weiss, is rather misleading considering that one rarely finds the former as large as 20 mm. and the latter as small as 15 mm. A series of *maculativentris* averages about 16 mm., and *rusticorum* 20 mm., with specimens of the latter 22 and 23 mm. not uncommon.

W. J. Chamberlin in his published notes[4] remarks that *maculativentris* can always be told from *rusticorum* by the spines or teeth on the tip of the elytra. This is generally true, although I have found many exceptions, where the tip was perfectly smooth, showing no sign of tubercles or teeth. The western phase, *subornata* Lec., in the small series before me, has the teeth.

In view of the above characteristics, the average size and the ease with which it may be separated from *maculativentris*, *rusticorum* in my opinion should be considered a distinct species. The variety *subornata* is apparently the western phase of *maculativentris*.

Buprestis langi Mann.

I have before me 58 specimens of *Buprestis langi* Mann. and 41 specimens of *B. fasciata* Fab. of both sexes. I have also examined a large series of both species in the Canadian National Collection. Nicolay and Weiss[5] very excellent descriptions will serve to separate them easily. Aside from the differences in the key I find that the generally more elongate form in *langi* with the more abruptly rounded margins of the elytra in *fasciata* also is very variable in both species, the females of *fasciata* seem to be always maculate while as a rule the females of *langi* are immaculate. *B. fasciata* is supposed to breed in maple

[4] Pan-Pac. Ent., Vol. V, No. 2, Oct., 1928, p. 95.
[5] Jl. N. Y. Ent. Soc., Vol. XXVI, June, 1918.

and poplar and Dr. Van Dyke gives the host of *langi* as Douglas fir. Dr. Burke also writes me that he took all stages from the same host. Evidently it is not the only host. as many of my specimens have been taken on willow in Southern California at least 300 miles from any Douglas fir. In British Columbia, in all our cage experiments with Douglas fir, where whole infested trees have been caged, we have never bred *langi*, although the trees have been caged for several years.

The differences between *langi* and *fasciata* may be a little more definitely expressed by the following:

Elytral striæ moderately deep, punctures small; costæ broad and flattened.....*fasciata* Fab.

Elytral striæ deep, punctures large; costæ narrow, not flattened.....*langi* Mann.

I have failed to find any difference in the lustre of the costæ or intervals as stated by Nicolay and Weiss. Occasional dull specimens occur in both species. I have one *langi* entirely black, not shining. Melanic forms are not uncommon in the *Buprestidæ* as I have a specimen of *B. aurulenta* which is also entirely black.

Mr. Chamberlin in his notes above referred to (p. 94) gives some differences between the species *langi* and *fasciata* especially in form, which is entirely correct from my observations. But in regard to colour and maculation no definite rule can be laid down for either sex. Some of the males of *langi* seem fully as deserving of a varietal name as *B. lineata* var, *davisi* N. and W. The general scheme of maculation between the females, however, show the difference as explained above.

As the specific differences seem exceedingly well defined for this genus I consider *langi* a distinct species.

BUPRESTIS NUTTALLI Kby. var. ALTERNANS Lec. and var. CONSULARIS Gory.

I have before me 58 specimens of this complex, from both the east and the west, and have examined a large series in the Canadian National Collection with wide distribution. There is every conceivable elytral maculation from the transverse bands to specimens with two small dots and with elytra entirely black. While some typical examples, both east and west, can be sepa-

rated, the intermediate forms could be made into many separate varieties. The elytral intervals "alternately strongly convex" or "strongly convex" is variable and cannot be depended upon. There is every grade between "thorax sinuate or parallel" and "sides of thorax arcuate." The specimens so gradually merge from both varieties to *nuttalli* and the punctation of the abdomen is so variable between males and females that they cannot be separated. I therefore consider them one and the same species and that these varieties cannot be maintained. Nicolay and Weiss have already intimated that the var. *alternans* is the same as *nuttalli*. Typical examples of what is called *consularis* are often taken in British Columbia, and we have bred several from *Pinus ponderosa*, but as the other forms and intergrades are also taken here we cannot separate the series. Apparently the alternately convex intervals vary with the individual. Mr. K. G. Blair of the British Museum very kindly compared for me two specimens of *nuttalli* with Kirby's type.

A NEW SPECIES OF HELOPS FROM GUADALUPE ISLAND
(Coleoptera: Tenebrionidæ)

BY FRANK E. BLAISDELL, SR.
Stanford Medical School and California Academy of Sciences

Contributions to the knowledge of the Coleoptera of Guadalupe Island have been made from time to time. Dr. Geo. Horn in 1875 gave a list of a small collection made by Dr. Edward Palmer (Trans. Amer. Ent. Soc., V, 1876, p. 198). A single species of *Helops* being listed. Dr. Horn was not certain as to its specific status, recording it as *Helops bachei* Lec., var. In the Canadian Entomologist, vol. XXIX, 1897, H. C. Fall lists the known species of Coleoptera of the Southern California Islands, including those of Guadalupe Island, without adding any species to those reported by Dr. Horn, nor did he make any comments regarding the specific standing of *Helops bachei* Lec., var. In 1890, Col. Casey described *Helops guadalupensis* n. sp. (Ann. N. Y. Acad. Sci., vol. V) and evidently the one referred to by Dr. Horn. I consider it distinct from *bachei* Lec.

In 1922, the California Academy of Sciences sent an Expedition to the Island. Among the Coleoptera secured was a series of *guadalupensis* taken by Mr. J. R. Slevin. No additional

species of *Helops* was collected at that time. The species described below makes a rather unique addition to the genus and one that contrasts greatly with *guadalupensis* Casey.

Helops crockeri Blaisdell, n. sp.

Form elongate ovate, somewhat slender, head and pronotum relatively small; surface smooth, feebly sculptured. Color rufous, legs and under surface of body rufo-testaceous, outer four antennal segments fuscous to piceous.

Head as long as wide, sides arcuately prominent over the antennal insertions, beginning at base of the eyes, thence moderately convergent and arcuately emarginate to the narrowly rounded angles of the epistoma, the latter transverse and truncate at apex; labrum transverse, twice as wide as long, with sides and angles evenly arcuate, apex feebly and broadly emarginate, surface moderately finely punctate and sparsely pubescent; frons feebly convex, broadly but not deeply impressed between the antennal convexities and epistomal plane, surface coarsely punctate, becoming rugoso-punctate on vertex and tempora, where the punctures become more or less coalescent. Eyes obliquely transverse, narrow and strongly convex, moderately prominent, facets of moderate size and convexity, tempora not more prominent than base of the eyes. Antennæ long and slender, extending two or three segments beyond the pronotal base, outer four segments somewhat incrassate; segments nine, ten and eleven equal in length and twice as long as wide, third twice as long as the second and about a third longer than the fourth; fifth and sixth subequal in length and about twice as long as wide; seventh as well as the eighth slightly longer than the ninth, eleventh oblong oval, obliquely pointed at tip.

Pronotum about three-eighths wider than long, apex truncato-arcuate in moderate circular arc, angles rather broadly and evenly rounded; sides moderately arcuate, basal angles less broadly rounded; base moderately arcuate, as wide as the apex; basal bead flat and rather coarse, the lateral fine, apex not beaded; disk evenly but not strongly convex, densely rugoso-punctate, punctures more or less subcoalescent in twos to fours, central area less rugose.

Elytra oval, about three-fourths longer than wide, about three times as long as the pronotum; sides moderately and evenly arcuate, converging more toward base than toward apex, rather more strongly so and arcuately convergent apically, apex subparabolically rounded; humeri absent, disk strongly and subcylindrically convex, striæ of unimpressed punctures, the latter small and separated by a distance equal to four or five times their diameter; intervals very finely and sparsely punctured. Scutellum short and subhastate.

Propleuræ rugoso-punctate, punctures not strong, rugæ dis-

tinct and irregularly longitudinal. Prosternal process arcuate between the coxæ.

Abdomen finely and sparsely punctate, more or less feebly rugose laterally; segment five equal to the post-coxal part of the first, third about a half longer than the fourth, second about a sixth longer than the third. Legs slender; tarsi not dilated. Edeagus exposed. Described from the female holotype.

The male allotype is similar to the female, but more slender; antennæ longer, segments eight, nine and ten equal in length, three times as long as wide; eleventh a third longer than the tenth and three times as long as wide. Protarsi and mesotarsi dilated and pubescent beneath. Abdominal segments three, five and post-coxal part of the first quite equal in length; second about a third longer than the fourth.

Measurements: (Types) Length 8—9.5 mm.; width 3—4 mm.

Holotype, female, No. 3685, and allotype, male, No. 3686, in the collection of the California Academy of Sciences. Collected at the south end of Guadalupe Island, November 16, 1931, by J. T. Howell. I take pleasure in naming the species after Mr. Templeton Crocker, to whom the Academy is indebted for the opportunity of collecting on the Island.

Crockeri differs from the other species known to inhabit Guadalupe Island, by its rufous color, smooth surface and feeble elytral sculpturing and dull luster.

Guadalupensis Casey is of a more robust habitus, more piceous in color and the sculpturing stronger, the striæ of the elytra being impressed and the form not so ovate, the head and pronotum being relatively larger. *Benitensis* Blais. is from Middle Benito Island and is strongly sculptured, the pronotum densely and moderately coarsely punctate, the elytra striato-subcostate, the propleuræ densely and distinctly moderately coarsely punctate and the form is more parallel.

A Word From Dr. Van Dyke

The latest communication received at the Academy from Dr. E. C. Van Dyke was from Cairo, Egypt. He was planning to do some collecting in Egypt and then go on to Algeria for more field work. He expects to be at the British Museum through most of May, reaching Cambridge, Massachusetts, early in June. He reports an interesting and profitable trip, much of his time having been spent studying at the British Museum and at other of the large museums of Europe.—E. P. Van Duzee.

A NEW WHIP-SCORPION FROM CUBA

BY WILLIAM A. HILTON

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In using the genus *Schizomus* Cook, I follow Hansen who distinguishes this from the genus *Trithyreus* although the two are closely related. In fact as has been shown by Hansen the only point of difference between these lies in a single but well-marked character; in *Trithyreus* the second tergite is divided or nearly divided into two lateral parts by a median suture or line and in *Schizomus* the second tergite is one piece. The number of joints in the flagellum is not a good generic character. In most species of *Trithyreus* it is three-jointed but in all the California representatives of this group that I have examined it is clearly four-jointed. Many members of the genus *Schizomus* are four-jointed but mine from Cuba and some others described are three-jointed.

Schizomus antilus Hilton, n. sp.

Cephalothorax: Head with a faint eye-spot on each side. Cephalic sternum slightly longer than broad, second cephalic tergite one piece.

Palps: Moderately heavy, less than one-half the length of the body or 1.90 mm. long to 4.5 mm. body length. The front lower angle of the trochanter forms a sharp angle. Its outer part bears five large marginal hairs and two smaller ones. The claw is slightly longer than the tarsus.

First Leg: Slender, about the length of the body or 4.513 mm. The lengths of the joints are as follows: coxa, .53 mm.; trochanter, .315 mm.; femur, 1.012 mm.; patella, 1.215 mm.; tibia, .765 mm.; first metatarsus, .0225; second metatarsus, .31 mm.; first tarsus, .045 mm.; second to fifth tarsals, .056 mm.; sixth tarsal, .13115 mm.

Fourth Legs: These are less than the length of the body or 3.825 mm. long. The femur is a little more than three times as long as broad.

Three last abdominal segments not much telescoped.

Flagellum: About six times as long as broad, three-jointed, the tip joint over twice the length of the basal joint which is nearly twice as long as the second joint. Twelve hairs are borne on the appendage.

Mandibles: The fixed jaw bears a large outer pointed tooth, a smaller inner double pointed tooth and three smaller teeth in between.

Color: A light brown, the legs lighter.

Measurements: Length of body, 4.5 mm.; palps, 1.9025 mm.; first leg, 4.51315 mm.; last leg, 3.825 mm.

Locality: Corall Nuevo, Cuba, at about 1500 ft. altitude in a royal palm thicket.

Type: A female, in the Pomona College collection. This was compared with several from the same locality and others from near Havana, all seemed to be the same species.

This species seems nearest *S. flavescens* Hansen according to keys and description, but differs in several points. The character of the teeth on the fixed finger of the mandible is distinctive as also the hairs on the free margin of the coxa of the palps.

Two Interesting New Records

Eudistenia costipennis Fall. Two examples of this rare species were taken from pupal chambers in the hard dead wood of *Quercus chrysolepis* at Chiquito Basin, Madera County, Calif., elevation 4500 ft., on April 4, 1932, by Mr. R. L. Furniss. Although Dr. Fall's original specimens were beaten from oak, and later specimens have been captured on a dead yellow pine stump in Yosemite Valley, Calif., this is the first definite host record regarding this species.

Aneflomorpha longipennis Casey. Data concerning the flight period of this species has been recently obtained by Mr. A. E. Michelbacher of the University of California. During the summer of 1931 Mr. Michelbacher was running a series of light traps at Clarksburg, Yolo County, Calif., in connection with an experimental problem, and observed this insect coming in numbers. The first specimens appeared on July 8, and the last on September 25. The species was most abundant in the latter part of July and seemed to prefer warm evenings for flight. In view of the rarity of this species in collections it is interesting to note that, during 1931 at least, its flight period lasted more than two months.—E. Gorton Linsley.

A NEW SPECIES OF NEOCLYTUS FROM WHITE FIR

(Coleoptera, Cerambycidæ)

BY E. GORTON LINSLEY
Oakland, California

Neoclytus nubilus Linsley, new species

Elongate, dark brown, rather sparsely sprinkled with white pubescence. Head moderately finely punctured, somewhat granulate; antennæ slightly more than half as long as body (♂), about half as long as body (♀), not appreciably thickened apically. Prothorax without fasciæ, sparsely and irregularly clothed with white hairs; about as long as broad, base slightly wider than apex; transverse carinæ numerous, confined mainly to median area, apical carina nearly as long as two-thirds the width of the head; puncturation dense, moderately coarse. Scutellum black, naked. Elytra two and one-half times as long as broad; each elytron with three rather ill-defined fasciæ as follows: a broken fascia at basal third consisting of a short white line placed obliquely forward to the suture and a small round lateral spot, a V-shaped fascia a little anterior to apical third, and an irregular transverse line at apical sixth, the apices and area anterior to mid-fascia clouded with white pubescence; apices obliquely truncate. Body beneath and legs, irregularly clothed with white hairs. Length 15 mm., breadth 4 mm.

Type, female (No. 3699, Mus. Calif. Acad. Sci) and allotype, male (No. 3700, Mus. Calif. Acad. Sci.), collected at Bass Lake, Calif. on July 15, 1932, by Mr. R. L. Furniss, who very kindly submitted the specimens to me for study. Paratypes from the same series in the collection of Mr. Furniss, Mr. Geo. Hopping, and the writer. I am also indebted to Mr. J. M. Miller of the United States Department of Agriculture for the privilege of examining five additional specimens (also designated paratypes) from Long Barn, Calif. (Hopk.U.S. 19351g), G. R. Struble collector, in the collection of the United States Dept. of Agriculture at Berkeley. All specimens were reared from *Abies concolor.*

The female of this species was associated by Dr. Fall with the males of *Neoclytus modestus* in his original[1] description of the latter, and an example in the collection of Mr. Ralph Hopping from Kaweah, Calif., bearing a paratype label of *modestus* Fall, is clearly referable to *N. nubilus.* The resemblance between the males of *N. modestus* and the two sexes of *N. nubilus* is rather

[1] Fall, H. C. Journ. N. Y. Ent. Soc., XV, 1907, p. 81.

noticeable, but in the former species the sexes are very disimilar, and the scutellum densely clothed with white or yellowish pubescence. *N. modestus* is usually found in the lower altitudes on *Quercus agrifolia* and related species of oak, whereas *N. nubilus* is a high altitude form found on *Abies concolor*. The species is much more closely related to *Neoclytus muricatulus*, and in Mr. Geo. Hopping's recent revision,[2] runs near that species. It differs from the latter in size, coloration, type of pubescence and prothoracic sculpturing. That portion of Mr. Hopping's Key to *Neoclytus* (p.547) which treats related species, may be modified as follows for the insertion of *N. nubilus*:

CC. Antennæ not appreciably thickened distally.

D. Scutellum naked.

E. Elytral fasciæ obscured by clouded white pubescence; basal fasciæ incomplete. 10-16 mm. California.....*nubilus* n. sp.

EE. Elytral fasciæ clearly defined, distinct; basal fasciæ semi-circular, extending across the base of the elytra.

F. Each elytron with a fascia extending forward from the outer end of the mid-fascia. 8-10 mm. Colorado, Alberta....*ascendens* Lec.

FF. Elytra without such fasciæ.

G. Mid-elytral fascia obtusely angled at suture. 7 - 11.5 mm. North America. .....*muricatulus* Kby.

GG. Mid-elytral fascia straight. 9.5 - 10.5 mm. California.....*infans* Csy.

DD. Scutellum clothed.

E. Elytral fascia entire, arcuate; pronotum with interrupted mid-fascia and sometimes a marginal fascia. 9.5 - 10.5 mm. California..... .....*modestus* (♀) Fall

EE. Elytral fascia generally reduced to oblique sutural dashes; pronotum without fascia. 9 - 10.5 mm. California.....*modestus* (♂) Fall

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[2] Hopping, Geo. R., Rev. Clytini Pt. I, Ann. Ent. Soc. Am. XXV, 1932, pp. 529-568.

A NEW CALIFORNIA CLERID BEETLE

(Coleoptera)

BY E. GORTON LINSLEY
Oakland, California

The following species has stood under a manuscript name for some time, but has been left undescribed during certain observations on its life history. Although these studies are not yet completed, it seems best that the species be made known at this time. The description below will, I think, sufficiently diagnose the species, and is offered in advance of a more comprehensive paper which will appear at a later date.

Aulicus terrestris Linsley, new species

Head black, coarsely, densely punctured; palpi black; antennæ piceous, basal segments reddish. Prothorax black, constricted at base and before apex; surface coarsely, sparsely punctured, subapical constriction and median area smooth. Elytra bluish-black, humerus and a subapical spot red, the two connected along the lateral margin by a narrow red band. Legs black, claws simple in both sexes. Body black; abdomen black, margin and apical segments red; fifth ventral of female truncate, of male, emarginate at apex. Length 10 mm., breadth 4.5 mm.

Holotype, male (No. 3701, Calif. Acad. Sci.) and allotype, female (No. 3702, Calif. Acad. Sci.) collected by the writer on the east slopes of Mt. Diablo, Calif., May 10, 1931. Paratypes (collected May and June 1931-1932) in the collections of Dr. E. C. Van Dyke, Mr. E. C. Zimmerman, Mr. A. T. McClay, Mr. E. R. Leach, and the writer. Paratypes also deposited in the collections of the U. S. Nat. Museum, Mr. A. B. Wolcott, and Mr. J. N. Knull.

This species resembles *A. dentipes* Schffr, but differs in having the blue sutural vitta of the elytra wider than the red humeral space and in having all tarsal claws in both sexes uncleft. From *A. nero* (described from Mexico) it may be distinguished by the presence of a blue median fascia (entirely lacking in *nero*) and by the black ventral segments. *A. terrestris* appears to be a very constant species. In a long series studied there is little variation in size or color.

A NEW LOPIDEA FROM CALIFORNIA

BY E. P. VAN DUZEE

Lopidea usingeri Van Duzee, n. sp.

Much like *marginata* Uhler with the genital characters nearly of *nigridea* Uhler and *fallax* Knight; posterior disk of pronotum, scutellum and elytra dark sanguineous, the latter with a pale costa; length 6 mm.

Head as in *marginata* but with the post-ocular callous less conspicuous and the front fuller; antennæ perceptably stouter; pronotal humeri broadly rounded; rostrum attaining intermediate coxæ. Dextral male clasper very similar to that of *nigridea* but with its apex more oblique, the apical margin armed with a short black tooth near the prominent inferior apical angle and the basal dorsal hook more obtuse, straight and produced at a right angle; dextral spine of pygofer as in *marginata*. In *obscura* this clasper is narrower, its ventral apical angle more rounded, the supplemental dorsal tooth represented by a tubercle and the dorsal basal hook curved as in *nigridea*. *L. fallax* Knight is very similar but has the dextral clasper serrate at apex and wants the supplemental tooth before the apex.

Color pale yellowish, the posterior lobe of the pronotum, scutellum and elytra dark sanguineous and the costal margin narrowly whitish; base of vertex, a basal arcuate vitta either side of the front, clypeus, antennæ and rostrum black; feet fuscous, femora paler at base; tarsi black; narrow sutural and commissural margins black; membrane smoky; cheeks and disk of propleuræ tinged with red; ventral segments infuscated at base, becoming reddish laterally; genital segment fuscous at base, dextral clasper red its spines tipped with black.

Described from two males and five females. This species, like *obscura* exhibits considerable variation in the depth of coloring but generally the disk of the elytra, especially in the female, is quite broadly blackish. It gives me pleasure to dedicate this species to its discoverer, one of our enthusiastic young entomologists, who is doing good work in the Hemiptera.

Holotype, male, No. 3705, and allotype, female, No. 3706 Mus. Calif. Acad. Sci., and paratypes taken by Mr. Robert Usinger July 13 (type), 17, 20 and 22, 1927, at the Oakland Recreation Camp, Tuolumne Co., California.